CLAIMS

What is claimed is:

1. A method for determining muscle dysfunction of a subject, the method comprising the steps of:

(a) selecting a plurality of sites on the subject for sensing muscle electrical activity;

(b) calculating adipose thickness factors for the plurality of sites;

(c) making electrical activity measurements for the plurality of sites; and

(d) analyzing the electrical activity measurements and determining thereby analysis values for a plurality of muscles, each of the plurality of muscles corresponding to a respective one of the plurality of sites, and in determining the analysis values, factoring the adipose thickness factors into the electrical activity measurements.

2. The method of claim 1, the adipose thickness factors being determined by applying results of obtained measurements from a sampling of individuals, the results relating adipose thickness to general characteristics measured for the individuals, at least one general characteristic of the subject corresponding to at least one of the general characteristics measured for the individuals.

3. The method of claim 2, the results being represented in a set of coefficients that are applied to a formula, each coefficient relating to one of the at least one general characteristic of the subject and to one site of the plurality of sites on the subject.

4. The method of claim 3, the formula having a form:

$$\text{Adipose} = B_0 + B_1X_1 + \ldots + B_nX_n,$$

wherein B_0 through B_n comprise the set of coefficients for a given site, X_1 through X_n represent values for a different one of the at least one general characteristic of the subject, and n represents the number of the at least one general characteristic.

5. The method of claim 3, wherein the coefficients are regression-based coefficients.

6. The method of claim 3, the at least one general characteristic of the subject being a gender, a height, a weight, a Body Mass Index, a body type, a waist circumference, a chest circumference, a wrist circumference, or a light transmissiveness of skin.

7. The method of claim 1, the adipose thickness factors being determined by applying a formula that includes a set of coefficients, each coefficient relating to one of the plurality of sites on the subject.

8. A method for determining muscle dysfunction of a subject, the method comprising the steps of:

(a) selecting a plurality of sites on the subject for sensing muscle electrical activity;

(b) making electrical activity measurements for the plurality of sites; and

(c) performing an analysis of the electrical activity measurements, the analysis comprising steps of determining from the electrical activity measurements analysis values for each of a plurality of muscles and determining from the analysis values a degree of departure from a normal condition, wherein the degree of departure for the analysis values is normalized with respect to the plurality of muscles.

9. The method of claim 8, wherein the normal condition is an ideal normal condition.

10. The method of claim 8, the analysis further comprising a step of mapping the degree of departure for each of the plurality of muscles.

11. The method of claim 8, the step of making the electrical activity measurements at a plurality of sites being performed during specific periods in the execution of a set of motor tasks, and the degree of departure being determined by selectively integrating the analysis values across the set of motor tasks.

12. The method of claim 8, the electrical activity measurements relating to a performance of a motor task, and the analysis further comprising a step of determining a set of relationships for each of the analysis values, each relationship in the set for an analysis value relating the analysis value to one of the other analysis values as a pair, and the degree of departure being determined by selectively integrating across the set of relationships.

13. The method of claim 12, each relationship including a weighting factor that reflects a biomechanical significance in the execution of a motor task correlating the muscles associated with the pair of analysis values.

14. The method of claim 12, each relationship including a weighting factor that reflects a biomechanical significance that correlates the motor task with the one of the plurality of muscles associated with the analysis value.

15. The method of claim 12, each relationship including a factor that reflects a systematic variability in measurement of electrical activity.

16. The method of claim 8, wherein the degree of departure comprises a continuous measure.

17. The method of claim 8, further comprising a step of calculating adipose thickness factors for the plurality of sites, such that determining the analysis values comprises factoring the adipose thickness factors into the electrical activity measurements.

18. A system for determining muscle dysfunction of a subject, the system comprising:

(a) a plurality of electrical activity sensors for measuring electrical activity at a respective plurality of sites on the subject; and

(b) a processor for determining adipose thickness factors based on at least one general characteristic of the subject for the plurality of sites on the subject, and for analyzing the electrical activity and determining therefrom analysis values for a plurality of muscles, each of the plurality of muscles corresponding to a respective one of the plurality of sites, wherein determining analysis values comprises factoring the adipose thickness factors into the measured electrical activity .

19. The system of claim 18, the processor determining the adipose thickness factors by applying results of obtained measurements from a sampling of individuals, the results relating adipose thickness to general characteristics measured for the individuals, the at least one general characteristic of the subject corresponding to at least one of the general characteristics measured for the individuals.

20. The system of claim 19, the processor determining the adipose thickness factors by representing the results in a set of coefficients that are applied to a formula, each coefficient relating to one of the at least one general characteristic of the subject and to one site of the plurality of sites on the subject.

21. The system of claim 20, the formula having a form:

$$\text{Adipose} = B_0 + B_1X_1 + \ldots + B_nX_n,$$

wherein B_0 through B_n comprise the set of coefficients for a given site, X_1 through X_n comprise values for a different one of the at least one general characteristic of the subject, and n is the number of the at least one general characteristic.

22. The system of claim 20, wherein the coefficients are regression-based coefficients.

23. The system of claim 20, the at least one general characteristic of the subject being a gender, a height, a weight, a Body Mass Index, a body type, a waist circumference, a chest circumference, a wrist circumference, or a light transmissiveness of skin.

24. The system of claim 18, the processor determining the adipose thickness factors by applying a formula that includes a set of coefficients, each coefficient relating to one of the plurality of sites on the subject.

25. A system for determining muscle dysfunction of a subject, the system comprising:

(a) a plurality of electrical activity sensors for making electrical activity measurements for a respective plurality of sites on the subject; and

(b) a processor for analyzing the electrical activity measurements and determining therefrom analysis values for each of a plurality of muscles, and determining for each of the plurality of muscles a degree of departure from a normal condition by normalizing the analysis values with respect to the plurality of muscles.

26. The system of claim 25, wherein the normal condition is an ideal normal condition.

27. The system of claim 25, the processor mapping the degree of departure for each of the plurality of muscles.

28. The system of claim 25, the plurality of electrical activity sensors making electrical activity measurements during specific periods in the execution of a set of motor tasks, and the processor determining the degree of departure by selectively integrating the analysis values across the set of motor tasks.

29. The system of claim 25, the electrical activity measurements relating to a performance of a motor task, and the processor determining a set of relationships for each of the analysis values, each relationship relating the analysis value to one of the other analysis values as a pair, and the processor determining the degree of departure by selectively integrating across the set of relationships.

30. The system of claim 29, the processor factoring into each relationship a weighting factor that reflects a biomechanical significance for the performance of the motor task correlating the muscles associated with the pair of analysis values.

31. The system of claim 29, the processor factoring into each relationship a weighting factor that reflects a biomechanical significance that correlates the motor task and the one of the plurality of muscles associated with the analysis value.

32. The system of claim 29, the processor factoring into each relationship a factor that reflects a systematic variability in measurement of electrical activity.

33. The system of claim 25, wherein the degree of departure comprises a continuous measure.

34. The system of claim 25, the processor further calculating adipose thickness factors for the plurality of sites, and in determining the analysis values, factoring the adipose thickness factors into the electrical activity measurements.

35. A computer readable medium having stored therein one or more sequences of instructions for analyzing for muscle dysfunction of a subject, said one or more sequences of instructions causing one or more processors to perform a plurality of acts, said acts comprising:

(a) calculating adipose thickness factors for a predetermined plurality of sites on the subject; and

(b) analyzing electrical activity measurements and determining therefrom analysis values for a plurality of muscles, each of the plurality of muscles corresponding to a respective one of the plurality of sites, and in determining the analysis values, factoring the adipose thickness factors into the electrical activity measurements.

36. The computer readable medium of claim 35, the adipose thickness factors being determined by applying results of obtained measurements from a sampling of

individuals, the results relating adipose thickness to general characteristics measured for the individuals, the at least one general characteristic of the subject corresponding to at least one of the general characteristics measured for the individuals.

37. The computer readable medium of claim 36, the results being represented in a set of coefficients that are applied to a formula, each coefficient relating to one of the at least one general characteristic of the subject and to one site of the plurality of sites on the subject.

38. The computer readable medium of claim 37, the formula having a form:

$$\text{Adipose} = B_0 + B_1X_1 + \ldots + B_nX_n,$$

wherein B_0 through B_n comprise the set of coefficients for a given site, X_1 through X_n represent values for a different one of the at least one general characteristic of the subject, and n is the number of the at least one general characteristic.

39. The computer readable medium of claim 37, wherein the coefficients are regression-based coefficients.

40. The computer readable medium of claim 37, the one of the set of general characteristics of the subject being a gender, a height, a weight, a Body Mass Index, a body type, a waist circumference, a chest circumference, a wrist circumference, or a light transmissiveness of skin.

41. The computer readable medium of claim 35, the adipose thickness factors being determined by applying a formula that includes a set of coefficients, each coefficient relating to one of the plurality of sites on the subject.

42. A computer readable medium having stored therein one or more sequences of instructions for analyzing for muscle dysfunction of a subject, said one or more sequences of instructions causing one or more processors to perform a plurality of acts, said acts comprising:

(a) calculating adipose thickness factors for a predetermined plurality of sites on the subject;

(b) determining analysis values for each of a plurality of muscles from electrical activity measurements for the plurality of sites; and

(c) determining from the analysis values, a degree of departure from a normal condition, the degree of departure being normalized with respect to the plurality of muscles.

43. The computer readable medium of claim 42, wherein the normal condition is an ideal normal condition.

44. The computer readable medium of claim 42, wherein said acts further comprise mapping the degree of departure each of the plurality of muscles.

45. The computer readable medium of claim 42, wherein the electrical activity measurements are previously made at the plurality of sites are for specific periods in the execution of a set of motor tasks, and the degree of departure is determined by selectively integrating the analysis values across the set of motor tasks.

46. The computer readable medium of claim 42, the electrical activity measurements relating to a performance of a motor task, and said acts further comprise determining a set of relationships for each of the analysis values, each relationship in the set for an analysis value relating the analysis value to one of the other muscle analysis values as a pair, and the degree of departure being determined by selectively integrating across the set of relationships.

47. The computer readable medium of claim 46, each relationship including a weighting factor that reflects a biomechanical significance in the execution of a motor task correlating the muscles associated with the pair of analysis values.

48. The computer readable medium of claim 46, each relationship including a weighting factor that reflects a biomechanical significance that correlates the motor task with the one of the plurality of muscles associated with the analysis value.

49. The computer readable medium of claim 46, each relationship including a factor that reflects a systematic variability in measurement of electrical activity.

50. The computer readable medium of claim 42, wherein the degree of departure comprises a continuous measure.

51. The computer readable medium of claim 42, wherein said acts further comprise calculating adipose thickness factors for the plurality of sites, and in determining the analysis values, factoring in the adipose thickness factors.

52. A back muscle dysfunction evaluation network for determining muscle dysfunction of subjects comprising:

(a) at least one data collection system for making electrical activity measurements at a respective plurality of sites on each of the subjects;

(b) a data analysis system for analyzing the electrical activity measurements and determining therein analysis values for a plurality of muscles, each of the plurality of muscles corresponding to a respective one of the plurality of sites; and

(c) a communications link linking the data analysis system and the data collection system, for transmitting the electrical activity measurements of subjects to the data analysis system.

53. The back muscle dysfunction evaluation network of claim 52, the data analysis system comprising a processor and sample database, the processor using the sample database to determine the analysis values for the plurality of muscles and to analyze the analysis values.

54. The back muscle dysfunction evaluation network of claim 52, the data analysis system producing a report on a degree of departure from a normal condition for each of the plurality of muscles, and the communications link transmitting the report to the data collection system.

55. The back muscle dysfunction evaluation network of claim 54, wherein the degree of departure for the analysis values is normalized with respect to the plurality of muscles.

56. The back muscle dysfunction evaluation network of claim 52,

the data collection system making a measurement of at least one general characteristic of each subject,

the communications link transmitting the measurement of the at least one general characteristic to the data analysis system, and

the data analysis system determining adipose thickness factors for the plurality of sites on the subject based on the at least one general characteristic of each subject, and in determining analysis values, factoring the adipose thickness factors into the electrical activity measurements.

57. The back muscle dysfunction evaluation network of claim 56, the at least one general characteristic of each subject being a gender, a height, a weight, a Body Mass Index, a body type, a waist circumference, a chest circumference, a wrist circumference, or a light transmissiveness of skin.

58. The back muscle dysfunction evaluation network of claim 52, the communications link is an Internet connection.

59. A system for determining muscle dysfunction of a subject, the system comprising:

(a) a means for making electrical activity measurements for a respective plurality of sites on the subject; and

(b) a means for analyzing the electrical activity measurements and determining therein analysis values for each of a plurality of muscles from the electrical activity measurements, and for determining from the analysis values for each of the plurality of muscles a degree of departure from a normal condition by normalizing the analysis values with respect to the plurality of muscles.

60. A muscle dysfunction report comprising:

(a) a reference to a tested muscle; and

(b) an impairment value representing a degree of departure of the muscle from an ideal normal condition,

wherein different muscles having the same degree of departure have the same impairment values.

61. The muscle dysfunction report of claim 60, wherein the impairment value relates to an impairment index capable of characterizing any degree of departure of the muscle from an ideal normal condition.